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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/681,374	03/27/2001	Xiao-Dong Sun	RD-27727	3259

6147 7590 05/20/2004

GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
SCHENECTADY, NY 12301-0008

EXAMINER

MACCHIAROLO, PETER J

ART UNIT	PAPER NUMBER
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2879

DATE MAILED: 05/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/681,374

Applicant(s)

SUN ET AL.

Examiner

Peter J Macchiarolo

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-25 and 39-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,7-25,39,40 and 43-46 is/are rejected.
- 7) ☒ Claim(s) 2,5,6,41 and 42 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: See Continuation Sheet.

DETAILED ACTION

Response to Amendment

1. The reply filed on 04/01/2004 consists of changes to the claims, and further, the reply consists of remarks related to the prior rejection of claims in the previous Office Action. The request for continued examination filed 04/30/2004 is acceptable and an RCE has been established. However, pending claims 1, 2, 4-25, and 39-46 are not allowable as explained below. An action on the RCE follows.

Claim Objections

2. Claim 4 is objected to because of the following informalities:
3. Claim 4 depends from canceled claim 3. For the purpose of Examination, the Examiner reads that claim 4 depends from claim 1. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 4, 7-11, 39, and 40 are rejected under 35 U.S.C. 102(e) as being anticipated by previously cited Jin et al (USPN 6250984: "Jin").

Art Unit: 2879

5. In regards to claims 1, 4, 7, 39, and 40, Jin discloses a composition for electron emitters comprising a mixture of carbon nanotubes and oxygen-containing compounds of alkaline-earth metals (Y-Ba-Cu-O col. 6, ll. 14-19), wherein said carbon nanotubes have a diameter in a range from about 1 nm to about 200 nm (col. 7, ll. 21-26), and said composition is coated on said electron emitters (figs. 2a and 2b).

6. The Examiner notes that the preamble recites that the composition is used for a gas discharge devices. This is an intended use type preamble, and is not afforded any patentable weight, since it merely recites the intended use of a composition. Where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone, the preamble is generally not accorded any patentable weight. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

7. The Examiner notes that the claim limitation "wherein said carbon nanotubes are produced by a catalytic cracking and pyrolyzing of hydrocarbons" in claims 7 and 18, are drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113). Therefore, the intermediate steps of the process, recited in claims 8-11 and 19-22, are likewise not afforded patentable weight.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 12-18, 23-25, and 43-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over previously cited Sugiyama (JP Patent Application 57-096453; "Sugiyama") in view of previously cited Lal (USPN 6451175; "Lal").**

9. In regards to claims 12-15, 18, 23-25, 43, and 44, Sugiyama discloses in figure 2, a fluorescent lamp comprising an electron emitter (1') disposed therein, with an electrically conductive material (1') coated with a mixture of carbon fibers and alkaline-earth metal oxides (abstract).

10. Sugiyama is silent to a gas, or the carbon nanotubes.

11. However, a fluorescent lamp having mercury vapor and a background gas of xenon at a pressure of less than about 0.3 kPa is known in the art.

12. Further, Sugiyama teaches the carbon fibers are dispersed in the composition to mechanically reinforce the substance to prevent physical defects, while Lal teaches the mechanical strength of carbon nanotubes (which have a diameter of about 1-100nm) are two orders of magnitude higher than that of conventional carbon fibers used in carbon-fiber composite materials.¹

¹ Lal, col. 1, ll. 24-28.

13. Therefore, in view of the above discussion, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substituting carbon nanotubes for Sugiyama's carbon fibers to allow for greater mechanical strength and prevent physical defects of Sugiyama's composition.

14. In regards to claims 16-17, and 45-46, Sugiyama teaches that 20-50 weight% of carbon is preferable in the composition, but many different percentages are acceptable.²

15. Further, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. One of ordinary skill would be motivated to formulate this specific composition for a variety of reasons, including material availability.

16. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the gas discharge device of Sugiyama, with a proportion of carbon nanotubes in the composition being in a range from 30% to 90%, since discovering the optimum or workable ranges involves only routine skill in the art.

Allowable Subject Matter

17. Claims 2, 5, 6, and 41, 42, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

18. The following is a statement of reasons for the indication of allowable subject matter:

² Sugiyama, p. 4, numbered para. 8.

Art Unit: 2879

19. The prior art of record discloses fluorescent lamps with carbon nanotubes coated on the filament. See previously cited U.S. PG PUB 2002/0121856 to Tsai. Furthermore, the prior art of record discloses fluorescent lamps having protective coatings on the filament. See USPN 6137225 to Heuvelmans et al. Also, the prior art of record discloses compositions including oxygen-containing compounds of alkaline earth metals and carbon nanotubes. However, the prior art of record fails to disclose or motivate the composition of carbon nanotubes and alkaline-earth metal oxides.

Response to Arguments

20. Applicant's arguments filed 04/01/2004 have been fully considered but are moot in view of the new ground(s) of rejection.

21. The Examiner notes that even though Jin teaches away from exclusively using barium oxide coated on a tungsten cathode (col. 1, ll. 35-45), Jin does not teach away, but instead, discloses a composition for electron emitters comprising a mixture of carbon nanotubes and oxygen-containing compounds of alkaline-earth metals, specifically the compound Y-Ba-Cu-O recited at col. 6, ll. 14-19.

22. Furthermore, it is the Examiner's opinion that previously cited JP Patent Application 57-096453 to Sugiyama (translated PTO: 2003-4901; "Sugiyama") teaches away from Applicant's device as recited in claims 1 and 7. Specifically, Applicant recites the composition is coated on the electron emitters, while Sugiyama teaches this configuration has poor electron discharge efficiency (see numbered paragraph 2, page 2). Instead, Sugiyama discloses that a metal pot 1

Art Unit: 2879

(equivalent to Applicant's electron emitters) is filled with the composition. Thus, Sugiyama's composition is not coated on the electron emitters, but rather in the emitters.

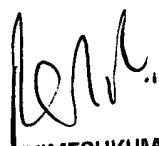
Conclusion

23. Previously cited U.S. Patent 6,294,867 to Lynn is evidence that a fluorescent lamp comprising mercury vapor and a background gas of xenon at a pressure of less than about 0.3 kPa is known in the art.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Macchiarolo whose telephone number is (571) 272-2375. The examiner can normally be reached on 8:30 - 5:00, M-F.

25. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel can be reached on (571) 272-2475. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

26. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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